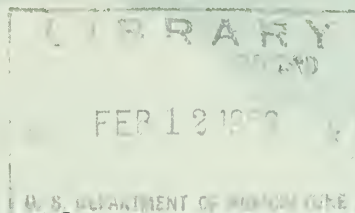


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MANAGING A SMALL FOREST IN EAST TEXAS

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This paper is based on work conducted at the East Texas Research Center, which is maintained at Nacogdoches, Texas, by the Southern Forest Experiment Station in cooperation with Stephen F. Austin State College.

Research at this center is concentrated on the 2,500-acre Stephen F. Austin Experimental Forest in Nacogdoches County and on the nearby Kurth Tract. Here specialists are making basic studies in soils, plant physiology, entomology, forest management, fire, and regeneration. Some work is also under way at the San Jacinto Experimental Forest in Walker County and elsewhere in east Texas.

Cover: *Stephen F. Austin Farm Forest.*

MANAGING A SMALL FOREST IN EAST TEXAS

Carter B. Gibbs

Southern Forest Experiment Station

America's demand for timber is increasing. The U. S. Forest Service estimates that the market for wood will double before the century is out. Much of the timber to supply the mills of the future will come from small tracts, for more than half the nation's forested area is in holdings of less than 5,000 acres. Today's small-tract owner has a better opportunity than ever before to make money by growing trees.

Most small woodlands are producing only a fraction of their potential income--and those in east Texas are no exception. To gain information that would aid forest managers in this region, a tract on the Stephen F. Austin Experimental Forest was designated as a farm forest in 1947. It contains 67 acres. In size it is thus very close to the 65-acre average for the forested portions of small landownerships in east Texas.

Prior to 1947 the experimental tract had been cut heavily at least three times. Each cut had removed the best timber. The first cut had been in the 1890's, the second about 1915, and the last in the late 1930's. In 1947 the average acre had 3,300 board feet (International 1/4-inch rule) of rough pine and 2,612 of low-quality hardwood. Though this stocking was a little heavier than average, the tract shared the problems common to the region's small forests. Low-quality hardwoods were occupying sites that should have been growing pines. Desirable trees were small in size and few in number. Many areas needed seeding or planting. Cattle grazing had to be controlled.

The objectives of management were threefold:

- To apply the kind of forestry that would be practical for most owners
- To determine the costs and returns
- To demonstrate the possibilities of getting an annual income while rebuilding the forest.

What Was Done

To concentrate each year's operations, the tract was divided into five compartments of about 13 acres each (fig. 1). One compartment is harvested every year, so that the entire forest is worked over in 5 years. The 1957 harvest marked the end of the second 5-year cutting period.

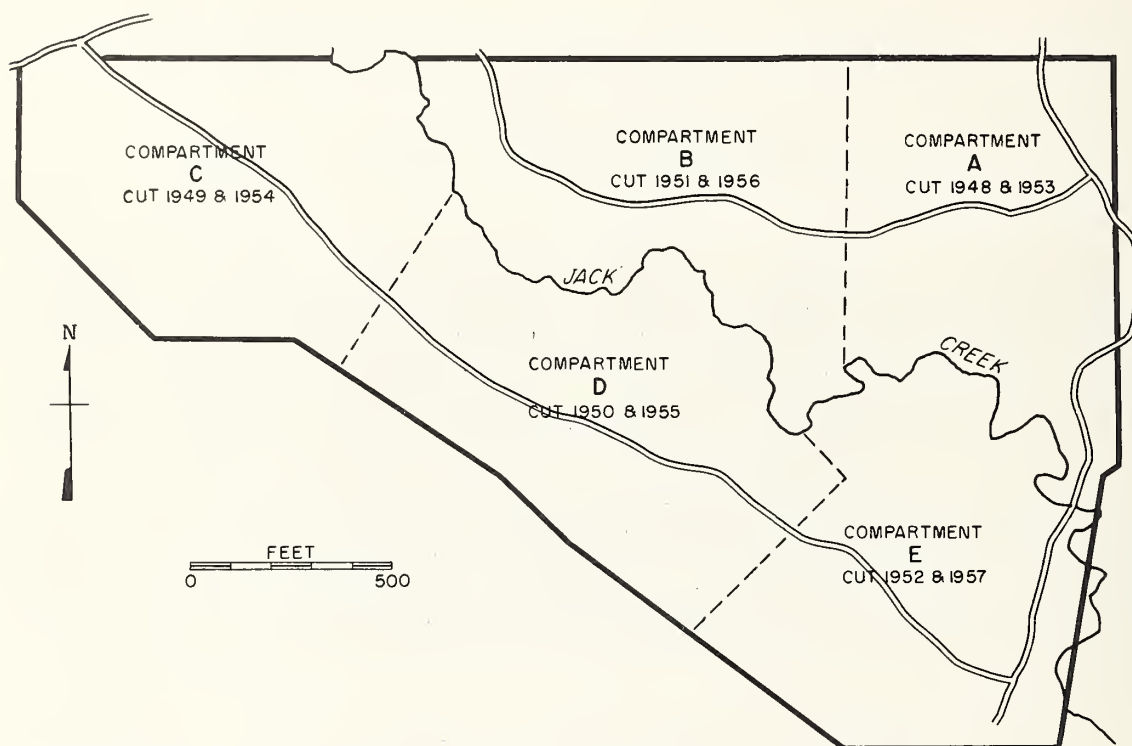


Figure 1.--Compartments of the Stephen F. Austin Farm Forest.

Each time a compartment is due for a cut, all pines in it are inventoried to determine how much the stand has grown since the previous cut. One-half to two-thirds of the growth is harvested; the rest is left to build up the stand.

Trees marked for cutting may occur singly or in small groups. A stand is never cleared off completely, though small openings may be made here and there. In marking pines to sell, the principle is "Take the worst first." Most of the trees that were damaged by insects, disease, or fire, or those that were coarse-limbed or otherwise of poor form, were removed in the first cut. In the second cycle, the bulk of the volume came from thinning and from harvest of large mature pines.

Most of the 67 acres are moderately dry uplands capable of growing good pines but unsuited to the production of quality hardwoods. For this reason, all upland hardwoods that would make a sawlog or crosstie were sold as soon as possible. A small amount of promising hardwood was retained on favorable branch-bottom soil.

A tie operator went over the entire tract in 1947, removing all hardwoods suitable for his purposes. After that, the initial cut on each compartment included all salable hardwood sawlogs. In addition, unmerchantable hardwoods that were overtopping natural or planted pines were deadened. Those 8 inches or above were girdled with an ax or the Little Beaver power girdler. Smaller hardwoods sprout prolifically when girdled or felled, but the Little Tree Injector, loaded with 2,4,5-T, has been very effective in killing both tops and roots.

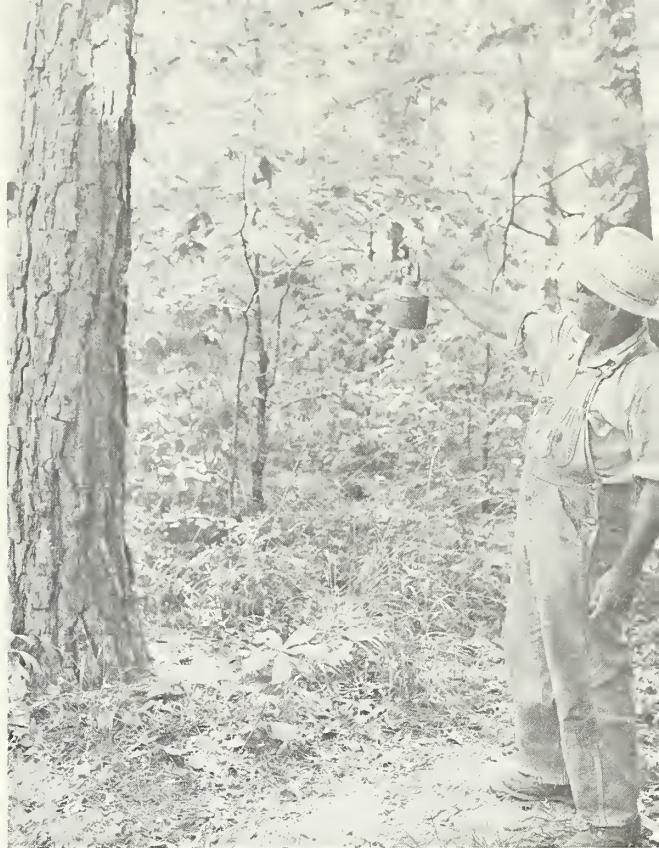
Hardwoods suitable for wildlife food and dens are retained.

Wildfires have been strictly controlled with the cooperation of the Texas Forest Service, and cattle grazing has been held to safe limits. Pine sites infested with small hardwoods were prescribe-burned to prepare them for seeding or planting. Fire will not be used at all when the forest becomes fully stocked to all sizes of pines, because small pines are very susceptible to fire damage.

Results of Management

Pine growth on the forest ranged from 106 to 220 board feet per acre annually. It varied from compartment to compartment (table 1), being influenced not only by the pine stocking but also by the density of competing hardwoods.

In 1947 the pine volume on the entire tract was 222,894 board feet. By 1957 it had increased to 243,552 board feet. This increase of 20,658 board feet, plus 92,875 board feet that were harvested (table 2), brings the total growth to 113,533 board feet for the ten years of management.



Marking a tree for harvest. Poor-risk and inferior trees are marked first, and then the rest of the harvest is taken from large, high-quality timber.

The Little Tree Injector with a silvicide like 2,4,5-T is a safe and effective method of killing undesirable hardwoods. Results are best when hardwoods are treated in spring or early summer.



Table 1. --Growth per acre, by compartments

Compartment	Volume after first cut	Volume 5 years later	Annual growth
	Board feet	Board feet	Board feet
A	3,827	4,803	195
B	2,619	3,317	140
C	3,702	4,803	220
D	2,574	3,105	106
E	3,076	3,697	124

Table 2. --Products harvested, 1947-1957

Year	Pine logs, Int. 1/4- inch rule	Hardwood logs, Int. 1/4- inch rule	Hardwood ties	Pine pulpwood	Pine posts
	Board feet	Board feet	No.	Cords	No.
1947	...	...	883	...	...
1948	6,903	6,410	...	3.63	...
1949	7,044	1,023	...	...	124
1950	7,231	7,104	...	...	...
1951	12,397	5,529	...	...	...
1952	8,375	6,547	...	...	285
1953	11,108	1,109	...	2.50	...
1954	11,673	3,527	...	4.00	...
1955	13,300	...	...	6.50	...
1956	8,800	...	...	...	...
1957	6,044	...	...	...	...
Total	92,875	31,249	883	16.63	409

Thinning shortleaf pines for pulpwood.



All timber was sold as stumpage. In addition to the pine logs, the sales included hardwood sawlogs and ties and some pine pulpwood and fenceposts. The annual harvests rarely amounted to more than a half-dozen truckloads. In the past, small sales have often been difficult to make. Now they are much easier, especially if the tract is near a good road and the offering includes a reasonable amount of pine.

As table 3 shows, the gross returns from stumpage sales have been nearly \$2,800, or \$4.15 per

Table 3. --Ten-year costs and returns^{1/}

Stumpage sales	
92,875 bd. ft. of pine at \$25 per M	\$2,321.88
31,249 bd. ft. of hardwood at \$3 per M	93.75
883 hardwood crossties	295.68
16.63 cords of pine pulpwood at \$3 per cord	49.89
409 posts at \$0.04 each	16.36
Cash receipts	\$2,777.56
Costs	
Taxes, 67 acres at \$0.15 per acre, 10 years	\$100.50
Hardwood control, 171.1 hrs. at \$1.00 per hr.	171.10
Planting, 124.1 hrs. at \$1.00 per hr.	124.10
Burning, 53.8 hrs. at \$1.00 per hr.	53.80
Town ant control, 3.0 hrs. at \$1.00 per hr.	3.00
Scaling, 32.0 hrs. at \$1.00 per hr.	32.00
Marking, 91.0 hrs. at \$1.20 per hr.	109.20
Supplies--fuel, seedlings, axes, etc.	45.14
Total expenditure	\$638.84
Net cash return per acre per year	\$4.15

^{1/} Labor costs and stumpage prices are based on estimated rates for the 10-year period.

acre annually. Pine logs brought 8 times as much per thousand board feet as hardwood logs. With ties included, the harvests contained as much hardwood as pine, yet the income from the hardwoods was less than \$400. The quality of the hardwoods could be improved under management on most of the tract, but pines are much more profitable.

From these gross returns must be subtracted the costs of managing the forest. Most of the outlays were for labor. Three and one-half man-days per year were devoted to controlling undesirable hardwoods and planting pine. Marking and scaling the harvests, controlled burning, and related activities took another 2-1/2 man-days annually. Taxes and supplies



In 1949, natural pine seedlings, scarcely visible, were released when overtopping post oaks were girdled.



By 1953, the seedlings had responded vigorously.



1957: the pines have completely occupied the site.

were additional expenses (table 3). The average for all costs was 95 cents per acre annually. Net yearly cash returns from management thus have been \$3.20 per acre.

These net returns do not fully measure the benefits from management. The increase in pine growing stock is worth about 80 cents per acre annually, so that the total net returns have been about \$4.00 per acre each year.

While management improved the growth prospects of the existing pines, a combination of poor seed crops and hot, dry summers prevented adequate pine reseedling. To supplement natural seeding, 8,900 pines were planted during the 10 years, but many of these also died of drought. Seedlings and saplings were sparse in 1947, and, while some young pines did become established, the forest still is seriously lacking in small trees. Figure 2 shows the changes in number of sawtimber pines between 1948 and 1957.

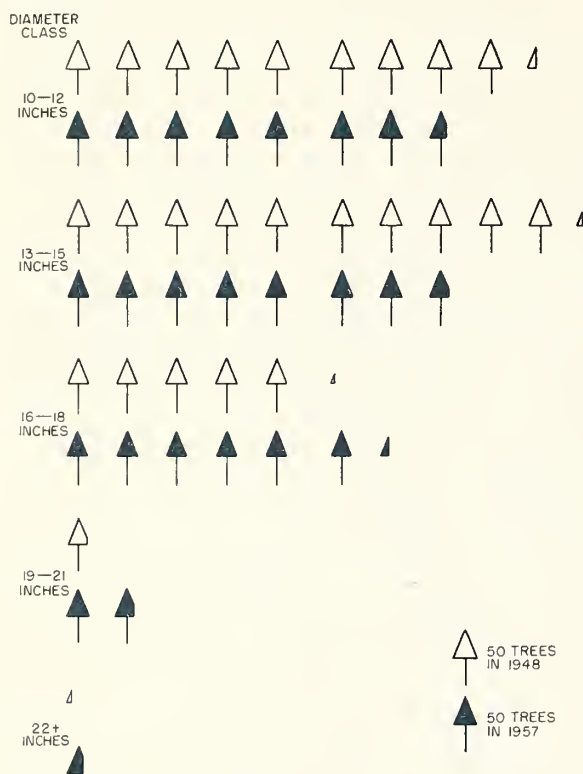


Figure 2.--Distribution of pine trees, by diameter classes, 1948 and 1957.

The unbalanced distribution of tree sizes is sure to be temporary. Improved methods of controlling hardwoods and brush have increased the success of recent plantings. Sooner or later, too, the return of normal weather will improve the natural seed catch.

Lightning and Ips beetles have killed a few trees, but in general the stand is healthy. Town ants have occasionally destroyed seedlings, but their colonies have been controlled with methyl bromide.

Recommendations to Landowners

Ten years of management have transformed a wild woodland into a managed forest, and at a modest cost in time and money. Timber stocking has been improved in volume and quality. This does not mean, however, that every small forest has to be managed by exactly the same methods as were used here.

The study was begun on the assumption that the owner of a small forest would want an annual income and that he would have to stretch his investment in labor and supplies over the years. Not all landowners need to operate under these restrictions.

For one thing, annual harvests are not always the most efficient. Cuts of entire small holdings at intervals of 3 to 5 years are larger in volume and hence can often be marketed more advantageously.

The upland portions of nearly all east Texas forests are dominated by low-grade hardwoods--as the experimental forest was in 1947. The sooner that the hardwoods are removed and replaced with pines, the more rewarding will be the investment. If the owner lives on his land, he can do much of the work himself. Non-resident owners will usually profit by contracting the hardwood-control job. Tree farmers who have completed this phase of management are almost unanimous in saying that the best time to tackle the hardwoods is in the first year or two.

In these early tasks, as well as in the more complicated decisions that will have to be made later, most owners will benefit from a forester's advice. The Texas Forest Service, besides assisting in fire protection, will, on request, provide technical guidance on individual tracts. Several lumber and pulp companies also offer free management assistance. Non-resident owners, especially, may be interested in hiring a consulting forester to manage their tracts.

Tree seedlings for planting are available at cost from nurseries of the Texas Forest Service. The Agricultural Stabilization and Conservation Program includes payments for planting trees and improving young pine stands; information about the program can be had from the county ACP committees.

The various kinds of assistance just described, the application of new forestry methods developed by research, and the rising demand for wood have eased many problems that formerly beset the managers of small forests. The owner who will make the most of today's opportunities has an excellent chance for earning money in the timber markets of tomorrow.



Planting a few pine seedlings each year can sweeten future harvests. In east Texas, pines should be planted between December 1 and March 1. They must be released from overtopping hardwoods immediately.

